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Body comprising a support structure made of assembled
partial modules

- 5 The invention relates to a body for a motor vehicle of the type specified in the precharacterizing clause of patent claim 1.

10 A body of this type, the support structure of which is composed of essentially four large-size partial modules, is already known from DE 198 33 395 A1. For example, a front end module and a basic module of this support structure each comprise support sections and wall and/or floor sections connected thereto. When the
15 partial modules are assembled, support sections of the one partial module are connected to associated support sections of the other partial module at abutment points.

- 20 The invention is based on the object of providing a body of the type mentioned at the beginning with which a highly stressed connection between partial modules can be realized in a very stable and simple manner.

- 25 This object is achieved according to the invention by the features of the main claim.
Advantageous refinements of the invention can be gathered from the remaining claims.

- 30 In the case of the support structure of the body according to the invention, the support sections of the two partial modules, which support sections are assigned in each case to one another, are assembled at abutting surfaces to form a continuous support in such
35 a manner that the abutting surfaces run obliquely with respect to the direction of extent of the support. This oblique profile of the abutting surfaces produces a

connection over a very large area in relation to the cross section of the support, which ensures an extremely stable connection of the two parts to each other. In addition, the oblique profile of the abutting surfaces permits manufacturing tolerances to be compensated for in a simple manner by it being possible for the support sections to be adjusted within certain limits both in the direction of extent of the support and in the vertical direction by the support sections being displaced with respect to each other - in the direction of the extent of the support. It can be seen that, as a result, the partial modules can all in all be aligned with respect to one another in a simple manner. In addition, the slope of the abutting surfaces can be matched in a simple manner, for example, to the bending stress or to the neutral fibers of the support. It should also be considered as included that the oblique profile of the abutting surfaces can also be formed by a plurality of steps which follow on from one another.

If the longitudinal member sections are arranged at the sides of a basic module and of a front end module, then, when they are joined together, lateral sills of the support structure are produced, these sills ensuring that the support structure is very highly stable in the connecting region of the two said partial modules.

If the abutting surfaces of the support sections assigned to one another are of planar design, then a particularly simple configuration of the support sections in the region of the abutting surfaces is possible.

If the support sections are formed in each case from a box profile which is closed on the end side by the particular planar abutting surface, then, when they are

joined together, a particularly firm connecting region is produced, with the support having a doubled, approximately 8-shaped box profile in cross section.

- 5 If the planar abutting surface and the respectively assigned box wall run at an acute angle with respect to each other and form a point of the support section, then the connection of the support section can be improved by means of a fastening tab arranged at the
10 front end of the point. In this case, the fastening tab ensures a particularly good connection of the point of the one support section to the other, as a result of which, for example, a "peeling off" - i.e. a detaching of the one support section from the point - is
15 particularly effectively avoided.

An additional connection and stiffening of the two partial modules is provided if, in addition to the support sections, also the wall and/or floor sections
20 of the modules are connected to one another in an overlapping manner.

In addition, an even more stable connection of the basic module and front end module is produced if in
25 addition upwardly protruding column sections of the two modules are connected to one another.

Further advantages, features and details of the invention emerge from the description below of a
30 preferred exemplary embodiment and with reference to the drawings, in which

fig. 1 shows a perspective exploded illustration of the support structure of the motor vehicle body according to the invention, which support
35 structure is assembled from large-size partial modules;

fig. 2 shows a further perspective exploded illustration of the support structure which is assembled from partial modules and is lined with outer panel parts;

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fig. 3 shows a perspective view of a partial module of the support structure designed as a front end module;

10 fig. 4 shows a perspective view of a partial module of the support structure designed as a basic module;

15 fig. 5 shows a perspective plan view of the basic module and the front end module after they have been joined together; and

20 fig. 6 shows a partial side view of the basic module and the front module after they have been joined together.

Fig. 1 shows, in a perspective exploded illustration, a support structure 10 of a motor vehicle body that is assembled from a plurality of large-size partial modules which are described in more detail below. In the exemplary embodiment shown here, the partial modules of the support structure 10 are produced in each case from a plurality of sheet-metal parts joined together; at the same time, however, the partial modules may also be pre-manufactured in different constructions, for example as a "space frame", as plastic parts, metal cast parts, as components in a "sandwich construction" or the like. In particular, combinations of different constructions are also conceivable for the joined-together partial modules, depending on application and loading. The individual modules are joined together in particular via bonding connections, welding connections or the like. At the

same time, other customary connections, such as screw connections or the like are conceivable.

5 A basic module 12 of the support structure 10, which basic module can be seen in an overall view of fig. 1 with fig. 4, essentially comprises a body floor 14 which is bounded laterally by longitudinal members 15. The basic module 12 reaches forward with longitudinal member sections 16 as far as column sections 18 of the front wall columns 20 which protrude upward from the respectively assigned, front ends of the lateral longitudinal member sections 16. The body floor 14 of the basic module 12 ends at a considerable distance behind the front end of the basic module 12 or behind the column sections 18 of the front wall columns 20. In this case, the body floor 14 is provided here with a central tunnel 22 and with crossmembers 24 which extend outward from this central tunnel and are connected fixedly to the longitudinal members 15. At the rear, 15 the basic module 12 ends behind rear wheel houses 26, to the inside of which the lateral longitudinal members 15 extend. Above the rear wheel houses 26, wall regions 30 of the particular, rear side wall are arranged. The basic module 12 is already equipped as far as possible 20 with the other partial modules before it is joined together. 25

A front end module 34, which can be seen in an overall view with fig. 3, belongs to the front crumple zone of the motor vehicle and is supported in a crash-stable 30 manner on the basic module 12 in a manner described in more detail below, is connected to the basic module 12. For this purpose, the front end module 34 comprises a front end region 36 of the body floor 14 which extends 35 between lateral longitudinal member sections 38 of the front end module 34. As can be seen in an overall view with fig. 5, the front end region 36 of the body floor 14 and the lateral longitudinal member sections 38 end

at least approximately level at the rear. At the front, the front end region 36 of the body floor 14 ends at a front end wall 40 of the passenger cell, extending from the front end region 36 of the body floor 14 as far as approximately level with the side wall edge of the support structure 10. The end wall 40 is bounded laterally by column sections 42 of the front wall columns 20 which protrude upward from the lateral longitudinal member sections 38 of the front end module 34. Front longitudinal members 44 can be seen at the front end of the front end module 34. Like the basic module 12, the front end module 34 is also already equipped as far as possible with the other partial modules, assemblies and lining parts before it is joined together.

A roof module 46 can be placed onto the basic module 12 and the front end module 34. At the rear, the basic module 12 is adjoined by a rear module 48 which, when the support structure 10 is assembled, belongs together with the rear end region of the basic module 12 to the rear crumple zone of the motor vehicle.

As illustrated in fig. 2, the support structure 10, which is assembled from the partial modules 12, 34, 46 and 48 is lined with outer panel parts of plastic, sheet metal or the like. Thus, in particular front wing linings are formed in such a manner that the joining point between the upwardly protruding column sections 18 and 42 of the basic module 12 and of the front end module 34 is covered and cannot be seen from the outside. Lateral sill linings 50 are designed in such a manner that the joining point between the particular longitudinal member sections 16 of the basic module 12 and the longitudinal member sections 38 of the front end module 34 is covered such that it cannot be seen from the outside.

Figures 5 and 6 illustrate the basic module 12 and the front end module 34 after they have been joined together, in a perspective plan view and in a partial side view, respectively. It can be seen that the front end region 36 of the body 14, which region belongs to the front end module 34, extends rearward over a considerable length region of the basic module 12 between the lateral longitudinal member sections 16. It can furthermore be seen that the mutually assigned, lateral longitudinal member sections 16, 38 of the front end module 34 and of the basic module 12 are assembled at abutting surfaces 54, 56 of the support sections 16, 38, which abutting surfaces run obliquely with respect to the direction of extent of the support, to form the continuous sill 15. The lateral longitudinal member sections 16, 38 of the front end module 34 and of the basic module 12 are designed here as a box profile of two assembled sheet-metal shells, the longitudinal member sections 16, 38 being closed on the end side, on the mutually facing end sides, in each case by the associated, planar abutting surface 54, 56. The abutting surfaces 54, 56 consist here of continuous, planar sheet-metal sections which are connected peripherally - for example via a welding connection - to the box profile of the longitudinal member sections 16, 38. Of course, it would also be conceivable, instead of the continuous sheet-metal sections completely closing the cross section of the box profile, to make use just of flanges which can be arranged, for example, peripherally on the end side of the box profile. It would also be conceivable for the oblique profile of the abutting surfaces 54, 56 to be able to be formed by a plurality of steps following on from one another. The planar abutting surfaces 54, 56 enclose an acute angle α , with the respectively assigned box wall of the corresponding longitudinal member section 16, 38, so that a point of the corresponding longitudinal member section 16, 38 is

formed by the planar abutting surface 54, 56 and the respectively assigned box wall. A fastening tab 62 is provided in each case at the front end of the respective points 58 of the longitudinal member sections 38 of the front end module 34, via which tab the longitudinal member sections 38 of the front end module 34 are additionally connected to the associated longitudinal member sections 16 of the basic module 34. In this case, the fastening tabs 62 are formed by extensions of the lower box wall 64 of the longitudinal member sections 38 and ensure a particularly good connection of the point 58, as a result of which, for example, a peeling off - i.e. a detaching of the support section 38 from the point 58 is particularly effectively avoided.

As figures 5 and 6 show, the abutting surfaces 54, 56 extend over the at least approximately entire overlapping length of the mutually assigned longitudinal member sections 16, 38. In this case, the length of the abutting surfaces 54, 56 corresponds approximately to the length of the adjacent front end region 36 of the body floor 14.

After the longitudinal member sections 16, 38 which are assigned in each case to one another have been joined together, lateral longitudinal members having a box profile which is doubled in cross section and is approximately 8-shaped, are produced. The abutting surfaces 54, 56 are fixed to one another via a bonding connection or similar joining connection and, if appropriate, also via a mechanical connection, such as a screw connection.

The upwardly protruding column sections 18, 42 of the basic module 12 and of the front end module 34 comprise joining surfaces which are matched in each case to one another and via which the column sections 18, 42 are

connected to form the front wall column 20. The upwardly protruding column sections 18, 42 in each case comprise a box profile which is closed in cross section, so that, after the associated column sections 5 18, 42 in each case have been joined together, particularly stiff door columns 20 having a box profile, which is doubled in cross section and is approximately 8-shaped, are created. The angular bonding of the column sections 18 to the longitudinal 10 member sections 16 of the basic module 12 or the angular bonding of the column sections 42 to the longitudinal member sections 38 of the front end module 34 provide a particularly stiff supporting of the front end module 34 on the basic module 12. In the transverse 15 direction of the vehicle, the position of the basic module 12 and of the front end module 34 are not determined by said joining surfaces 54, 56 but rather, for example, by bearing surfaces of the basic module 12 and of the front end module 34 in the region of the 20 central tunnel 22. In other words, the partial modules 12, 34 are aligned in relation to one another in the transverse direction of the vehicle by displacement along the abutting surfaces 54, 56. The front end region 36 of the body floor 14, which end region 25 belongs to the front end module, is connected in an overlapping manner to that region of the body floor 14 which belongs to the basic module 12, as is apparent in particular from fig. 5. In this case, the central tunnel 22 is molded both into the front end region 36 30 and into the body floor 14 and is provided with joining surfaces.

It should be considered as being included within the context of the invention that the abutting surfaces 54, 35 56 may also be of curved design.